

REMARKS

ON

*Mr.* ROBERT DOSSIE'S

INSTITUTES

OF

Experimental Chemistry,

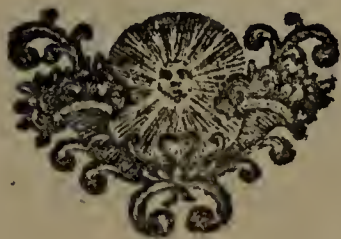
IN A

LETTER

Addressed to the Authors of the *Review*, &c.

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M.DCC.LX.

R E M A I N S

OF

M. ROBERT DOERING

INSTITUTES

OF

Experimental Chemistry

BY

J. L. R. D.

Author of the Elements of Chemistry



BOOK

Published by J. L. R. D.

1840



A

# LETTER, &c.

GENTLEMEN,

**I** HAVE observed, with regret, that you have not exercised the same critical discernment on books of chemistry and the chemical arts, as on those of less interesting subjects. The censures, passed in your Reviews, upon chemical performances, are sometimes just: the commendations are generally otherwise.

The *Elaboratory*, the *Handmaid*, and the *Institutes of Experimental Chemistry*, are examples of your being imposed on by the specious pretences of authors, and applauding without examination. The few following Remarks on the *Institutes*, wherein I have confined myself to those points which the author informs us in the preface he has particularly aimed at, will probably set this new luminary in a different point of view from that in which you have exhibited him.

B

The

The author has labour'd at "A system of chemical philosophy, founded, like the mechanical, on general principles." What he calls general principles are deduced only from particular facts, and by being made general, they are made false. Thus, as the metallic salt vitriol parts with its acid in the fire, it is affirmed that all metallic salts will do the same; <sup>b</sup> whereas, of those made with the marine acid, there is not a single one that will. In the table of specific attractions (one of the fundamental doctrines of his system) we are taught, <sup>c</sup> that all acids have a greater attraction to mercury than to silver, which, though true in regard to the marine acid, is false in regard to the nitrous; that they have a greater attraction to mercury than to tin or antimony, which is true in regard to the nitrous, and false in regard to the marine; greater to zinc than to iron, which is true in regard to the nitrous and marine, and false in regard to the vitriolic; greater to mercury than to lead, which seems to be true in regard to the vitriolic, but is false in regard to the

<sup>a</sup> Preface, Page xi.

<sup>b</sup> Vol. i. Page 367.

<sup>c</sup> Vol. i. Page 274.

nitrous and marine ; greater to fixt alkalies than to lime or metals, and greater to phlogiston than to any other of the bodies enumerated, both which are true or false according to the circumstances of application. Even the deflagration of nitre with inflammable substances, than which nothing seems to bid fairer for a general principle, is, in our author's sense, by no means such : For if the nitre be melted, and a certain proportion of some inflammable matters, as antimony freed from a part of its sulphur, be immersed in it, no deflagration will ensue. Our author, disregarding such particular circumstances, and depending on the universality of the principle, asserts falsely, that nitre cannot be melted in vessels made of the deflagrable metals, and that the empyrical fever powder is the same with diaphoretic antimony ; <sup>a</sup> the contrary of which is obvious from common experience, the fever powder proving generally purgative or emetic, which diaphoretic antimony is never observed to do. Nothing can be more dangerous in chemistry than this spirit of generalizing.

<sup>a</sup> Vol. i. Page 241.

The author presumes that he *has gone much farther in the investigation of the general principles, on which nature conducts her operations in the minuter parts of the system, than any writings already published lead.* He seems here to have an eye to the theories, or rather reveries, about animals and vegetables; as that of putrid ferments in the blood; of vital ferments transfused from birds to the egg, and there lying enveloped in particular vessels; and the project of explaining the phænomena of the animal and vegetable œconomy, from the water, salt, phlogiston and earth, into which the parts of animals and vegetables are resolved by putrefaction and by fire. The author himself admits, that by this ultimate resolution or destruction, nearly all the different parts of all animals and vegetables are reduced into the same principles: How then can we deduce, from those principles, even their obvious gross differences from one another? much less their different actions in the body of the living subject. The same heat which liquifies the glutinous matter of the animal solids, coagulates that of the fluids; and what water, salt,

salt, earth, oil or phlogiston, can be discovered in one more than in the other? The author indeed acknowledges, that nature, in many instances, deviates from the laws he has established; or in other words, that he has himself deviated from the laws established by nature. How can he pretend to have discovered the principles on which nature conducts her operations, when many of those operations are directly repugnant to the principles he has advanced!

He presumes also, that he has *made several material discoveries, relating to particular subjects.* What these discoveries are, I cannot find, unless they be some such as the following: <sup>a</sup> That stones are composed of earth and oil, in proof of which it is affirmed, that flints, distilled in a retort, give over an actual oil: This however is false, unless we suppose, with the author, that the bitumen, which yields the *British* oil, is flint: That neutral salts may be prepared by combining gypsum with acids <sup>b</sup>; whereas it is an

<sup>a</sup> Page 246, Vol. i.

<sup>b</sup> Page 361, Vol. i.

essential character of gypsum not to be combinable with any acid: <sup>a</sup> That the *sel de seignette* is the same with soluble tartar, <sup>b</sup> and the *spiritus salis marini coagulatus* the same with common salt; the contrary of which is not only obvious from experiment, but may even be deduced from the author's own theory; for as natron or soda, and the common vegetable alkalies, are admitted to be very different, does it not follow that salts compounded of the one, cannot be the same with those compounded of the other? <sup>c</sup> That nitre, deflagrated with sulphur, produces an alkaline salt; whereas it obviously produces no other than the *nitrum vitriolatum*: <sup>d</sup> That vitriolated tartar may be used to great advantage in making glass, on account of its fluxing quality; a quality which it absolutely wants: That *Saxon blues* may be dyed on the principle of oil of vitriol striking a blue colour with arsenic<sup>e</sup>; whereas these materials produce no manner of blueness, the substance which gives the colour, being no other than the common blue drug indigo: <sup>f</sup> That scarlet

<sup>a</sup> Page 300, Vol. i.   <sup>b</sup> Page 310, Vol. i.   <sup>c</sup> Page 340, Vol. i.  
<sup>d</sup> Page 309, Vol. i.   <sup>e</sup> Page 330, Vol. i.   <sup>f</sup> Page 410, Vol. i.



may be dyed with cochineal, by means of putrid urine; an addition which would destroy the scarlet tint : <sup>a</sup> That urine contains an acetous ammoniacal salt; whereas it contains, in the state he mentions it, neither one nor the other of the ingredients of that salt : That the matter in urine, which forms the calculus, is chemically of the same nature with tartar of vegetables; tho' it is acknowledged not to have any one of the specific characters of tartar, to be neither subacid, nor convertible into an alkali : That the pigment, called *Prussian* blue, is, in its whole substance, no other than a blue fixt animal sulphur ; <sup>b</sup> whereas it is demonstrable that *Prussian* blue is iron, and that no sulphur of any kind is contained in animals : That the property of galls, and some other vegetables, of turning solution of vitriol black, depends not on their astringency, but on a peculiar spirit<sup>c</sup>; a notion repugnant to the author's own principles, for the tinging matter cannot be made to *rise in distillation*,

<sup>a</sup> Page 456, Vol. i.    <sup>b</sup> Page 397, Vol. i.    <sup>c</sup> Page 39, Vol. ii.  
which

which is the essential character of spirits :  
 \* That volatile alkaline salts arise from acrid plants, with the heat of boiling water ; whereas nothing is found to arise with this heat but the water and essential oil of the plant : That the caustic acrimony of essential oils is universally in proportion to the strength of their smell<sup>b</sup> ; whereas the strongest smelling oil I know of (that of aniseeds) has the least acrimony : That spirit of wine dissolves myrrh<sup>c</sup>, and does not dissolve amber<sup>d</sup> ; whereas it really dissolves one as much as the other, extracting only a part from both : That this spirit dissolves no salts except the *sal diureticus*<sup>e</sup> ; whereas it is well known to dissolve many others, as the ammoniacal nitre, and most of the metallic salts made with the marine acid : That gold is made pale by fusion with nitre<sup>f</sup> ; the very substance principally made use of for heightening its colour : That calx of bismuth is not vitrescible<sup>g</sup> ; whereas there is no calx, except, perhaps, that of lead, which vitrefies so easily : That the conversion of iron into steel depends<sup>h</sup> on the expulsion of

<sup>a</sup>Vol. ii. Page 12, 84. <sup>b</sup>128. <sup>c</sup>164. <sup>d</sup>161. <sup>e</sup>36. <sup>f</sup>248. <sup>g</sup>i. 232. <sup>h</sup>ii. 377.

mineral sulphur ; the contrary of which is evident from the re-conversion of steel into iron, and other experiments. What the author means by his discoveries must, I think, be the foregoing, or others of the same kind, of which there is a very great number ; for I cannot recollect one instance, of his differing from what has been already published by others, either in theory or in matter of fact, without being plainly mistaken.

He has given full instructions for the fabrication of the apparatus, there not having been, before, any attempt towards accommodating the instruments of chemistry solely to experimental purposes. The attempts for this purpose of Glauber, Vigani, Becher, and Doctor Shaw, are well known. How far our author's apparatus comes short of some of theirs, and how much he has borrowed from a later writer, Cramer, will be obvious upon comparison.

He has subjoined ample directions for the execution of the operations. Many of these

C direct-

directions evince, that the author has no practical knowledge of them; for who, that is in the least conversant in chemical experiments, could think, for instance, of taking *Windfor* loam and *Sturbridge* clay as equivalent to one another, whether for lute, furnaces, or vessels; or of coating retorts for a land heat! Not to mention methods of operation more inconvenient than those in common use, though sometimes proposed as improvements, there are some processes directed in a manner absolutely impracticable. Thus the roasting of metallic ores, for the dissipation of their sulphur, is ordered to be performed in vessels well closed<sup>a</sup>; and in the smelting of ores, in mixture with the fuel<sup>b</sup>, the ore is directed to be thrown in at the small hole or slit, towards the bottom of the furnace, through which the nozzle of the bellows is inserted; a part where it is impossible to be thrown in. This error arises from misunderstanding *Cramer's* account. Our author has given directions for the fabrication of a smelting furnace, but if he had ever seen

<sup>a</sup> Page 294, Vol. ii. <sup>b</sup> Page 308, Vol. ii.

one, I think he could not possibly have fallen into such a mistake.

*The subjects are earths, salts, animals, vegetables, and metallic bodies. The author gives experiments and processes on the particular kinds of bodies, but has prefixed a concise view of the philosophicahistory of each article, and subjoined observations explanatory. A work conducted on this plan, how well soever executed, would not be a system of chemical philosophy; for, surely, it is not the business of chemical philosophy to mould common facts into the form of processes: The point ought rather to be, to deliver the simple truth, divested of that insignificant parade. If the system is compleated on this plan, it must extend to several scores of volumes.*

*The author informs us that nothing can be more crude and unsettled than the common distribution of bodies, that characteristic qualities are absolutely wanting; and that he thinks himself particularly happy in having been able to discover and mark out, by clear and evident*

*criteria, the distinctions of genus and species in bodies, from their real interior nature.* How happy he has been in this respect, will appear from a few examples. His criteria of earths are, to be incapable of analyzation, insoluble in water, infusible without vitrefication, incombustible, fixt, pulverine or friable. According to these characters, powdered platina is an earth, and chalk and all the calcareous earths are not earths. He divides earths into organical, metallic and lapidaceous. By *organic* earth is meant that of animals and vegetables; and though this earth is affirmed to be the same in both kingdoms, it is very certain that the vegetable earth differs essentially from the animal, and even one animal earth from another. The author admits that some animal earths burn into lime, and that others do not; how then can they be supposed to be in their real and interior nature the same? The specific characters of this *organic* earth, according to him, are, that it is *refractory in respect to vitrefication*, which is true only of the animal earth; and that it *refuses to combine*

*combine with acids*<sup>a</sup>, which is true neither of the animal nor vegetable. By *metallic* earths are meant the common calces of metals, which, being all capable of further decomposition, are, according to the definition, not earths. Nor is it true that they refuse to combine with mineral acids<sup>b</sup>, for I do not know of any one calx which the marine acid will not dissolve. *Lapidaceous* earths, or those which form stones, are subdivided into vitrescent per se, calcareous, and apyrous. Among the calcareous, or such as burn into lime, are reckoned those which burn not into lime, but into plaster of Paris<sup>c</sup>; and among the apyrous, or those which are not convertible into lime, is reckoned chalk<sup>d</sup>, the very substance from which lime is generally prepared. As to earths vitrescible per se, there is not a simple one known that is so. The author indeed gives a process for vitrefying the earth of flint<sup>e</sup>, but, like many others in this work, it is impracticable.—The criteria of salts are<sup>f</sup>, to be soluble in water and crystallizable.

<sup>a</sup> Vol. i. Page 231. <sup>b</sup> 232. <sup>c</sup> 234. <sup>d</sup> 236. <sup>e</sup> 247. <sup>f</sup> 259.

According to these criteria, quicklime is a salt, and vegetable fixt alkaline salts are not salts. In regard to lime, the author is aware that it answers his definition of salts, and therefore expressly admits that the pellicles which separate from lime water are a true salt<sup>a</sup>; but this is again repugnant to the criteria; the pellicles, in their present state, not being in the least dissoluble. Shall we call the earth, which incrustates tea-kettles, a salt, because it was once dissolved in the water? Or the human calculus a salt, because it was once dissolved in the urine?

The author establishes a new class of vegetable substances, under the name of *sulphureous*, whose distinguishing character is, that they flame in a certain degree of heat<sup>b</sup>: But how does this distinguish them from gums, of which it is also said, that in a certain degree of heat they flame and glow<sup>c</sup>. One of these sulphurs is flowers of benzoine; but flowers of benzoine are<sup>d</sup> admitted to be soluble in water

<sup>a</sup> Vol. i. Page 290. <sup>b</sup> Vol. ii. Page 21. <sup>c</sup> 19. <sup>d</sup> 45.



and crystallizable, which are the very characters by which we are taught to distinguish salts. Essential oils are said to be a species of ethereal oils<sup>a</sup>, but they are said also to be resolvable into ethereal oils and resin<sup>b</sup>; and how can they be a species of that which is only one of their ingredients? The specific character of ethereal oils is, that they rise with less heat than that of boiling water<sup>c</sup>; and yet the oily matter in burnt sugar<sup>d</sup> and burnt gum<sup>e</sup> is called ethereal, though it will not rise with double that heat. These are sufficient examples of our author's sagacity in classing bodies; and fixing clear criteria.

He admits that many of his experiments are taken from other writers. They are in general, however, taken very inaccurately; almost every thing seeming to receive a wrong cast in passing through his hands. Even Dr. Lewis's experiments on *platina*, where he had all the accuracy and precision he could wish for, and of which by the bye he has evidently read only a part, are

<sup>a</sup> Vol. ii. Page 41.    <sup>b</sup> 29.    <sup>c</sup> 24.    <sup>d</sup> 11.    <sup>e</sup> 18.

by our author in many places misrepresented and mistaken. He describes, for example, a process for separating platina from gold; by dissolving the compound in aqua regia, precipitating with fixt alkali, and washing the precipitate: The Doctor's experiment, from which this process is deduced by our author, proves that the platina cannot be separated by this means. He has generally done more than is expressed in his motto, *In nova fert animus, &c.* not only moulding the *body* into new forms, but evaporating the *spirit*.

I shall now, Gentlemen, leave the public to judge, what foundation there is for your encomiums of the *Institutes*; and how far the author's very unjust character of *Becher, Stahl, Boerhaave*, and other celebrated chemists, is just when applied to himself, that *the whole system is vain, empty, chimerical, and not to be even speciously deduced from any satisfactory experiments*: That most of his opinions have no foundation but in his own fancy, or in that of others from whom  
he

he has credulously copied the most absurd falsities : That he has first invented an hypothesis, and then invented facts to verify it : That, in regard to many facts, he is notoriously mistaken, perhaps from that volatility of thought, which prevents his distinguishing betwixt the vigorous sallies of imagination and demonstrative reasonings. <sup>a</sup>

The contemptuous vanity of this writer breaks forth equally in his other performances ; and his other performance, (reckoning the *Elaboratory* and *Handmaid* to be such) are equally contemptible with the present. I should have sent you some animadversions upon them as they made their appearance, if I had not thought yourselves to be more equal to the task. For though much of them is too absurd for serious criticism, it is surely of importance to point out some of the material errors, to prevent the inexperienced reader from being misled by them into unsuccessful and expensive schemes ; or from being disgusted with chemistry itself, from find-

<sup>a</sup> Vol. i. Page 228, 264, 279, 490, &c. &c.

ing so many things, delivered with the air of truth, prove on trial to be false.

Perhaps the foregoing observations on the *Institutes* may put the public sufficiently upon their guard ; and remind the writers of the critical Reviews, that if they fail in their duty and professed impartiality, they will not escape being properly exposed.

————— *Nothing extenuate,*  
*Nor set down aught in malice.* ———

*I am, Gentlemen,*

*Your constant Reader,*

A. Z.

